unrealistically high). Nonetheless, once again the potential areas of interference are extremely small. If the EIRP were lowered to +48 dBm and 24 dBi antennas used, all of the ITFS receive sites in the Phoenix response service areas except the four located in the northeastern cell would be completely immune to downconverter overload.

In conducting the analyses of the potential for downconverter overload, it was assumed that only one transceiver would be potentially interfering at a time. Yet, the Petitioners are certainly aware that more than one response station may be located in proximity to a given ITFS site. The prospects for multiple transceivers in close proximity to an ITFS receiver to operating simultaneously is extremely rare, particularly since system designers can employ software controls to prevent such occurrences. More importantly, any potential interference be avoided both through the interference abatement mechanisms described below. and through the use of system control techniques.

2. *There Are A Variety Of Tools Available For Curing Any Downconverter Overload That Does Occur Which Are Less Restrictive Than CTN's Proposed Solution.*

Although the Petitioners believe that the potential for interference from downconverter overload is far less than CTN fears, the Petitioners cannot say that such interference will never occur if the rules proposed in the Petition are adopted. Although the potential is minuscule, as the example put forth in the CTN Request illustrates, one can always assume a difficult scenario -- a co-polarized subscriber transceiver radiating directly into the main beam of an ITFS reception antenna which is located in close proximity. Nonetheless, the regulatory response to any problem that does arise is simple. Just as the Commission today requires licensees in several services to cure similar sorts of

interference,[121/] *the Petitioners believe that it should be the responsibility of the newcomer to cure at its cost any interference to a protected MDS and/or registered ITFS receive site installed prior to the activation of the transceiver, either by employing a mitigation technique such as those described below or by ceasing to operate the offending transceiver(s).*

In this respect, it should be noted that the Petitioners are proposing that registered ITFS receive sites receive far superior protection than they are entitled to when subjected to BDC overload caused by WCS operations. In its April 2, 1997 *Memorandum Opinion and Order* in GN Docket No. 96-228, the Commission ruled that a WCS licensee is only obligated to cure BDC overload if it operates with an EIRP in excess of 50 watts, and that after February 20, 2002 ITFS licensees are not entitled to any relief should they suffer BDC overload, no matter what power the WCS system employs.[122/] By contrast, the Petitioners are proposing that in the highly unlikely event BDC overload does occur, the licensee of the offending response station hub should be required to cure any interference to an ITFS receive site registered with the Commission prior to the filing of the application for the hub, regardless of the power of the transceiver and regardless of when the interference occurs.

The Petitioners also must stress that it will be necessary to cease operating transceivers in order to avoid interference in only the rarest of cases, because there are a variety of other less

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[121/] *See, e.g.*, 47 C.F.R. § 22.353 (Public Mobile Service stations must cure blanketing interference); 47 C.F.R. § 27.58 (WCS licensee must cure interference due to certain MDS/ITFS downconverter overloads); 47 C.F.R. § 73.88 (AM broadcaster must cure blanketing interference); 47 C.F.R. § 73.318 (FM broadcaster must cure blanketing interference).

[122/] *WCS Reconsideration Order*, 12 FCC Rcd at 3984-85.

draconian tools available for avoiding downconverter overload (including antenna repositioning, downconverter filtering, improved downconverter immunity, cross-polarizing response transmissions,[123/] shielding of receive antennas, and hub selectivity) in those isolated cases where an ITFS receive site is located within the >1% of the PSA where overload conditions might result. As demonstrated above, it will not be difficult to identify the small portion of a response service area in which any ITFS receive site could be vulnerable to BDC overload absent the application of mitigation techniques. Since ITFS receive sites are registered with the Commission, the installer of subscriber transceivers will be aware of their location in advance and be able to employ the many mitigation techniques that are available, techniques discussed in more detail below.[124/] In order to illustrate the mechanisms available for avoiding interference due to downconverter overload, the Petitioners' technical consultants have examined the scenario presented in the CTN Request, as well as several others.

[123/] One example of how CTN has over-estimated the risk is CTN's assertion that it would be "an unlikely occurrence" for all of the ITFS stations in a given area to operate utilizing the same polarization. *See* CTN Request, Engineering Statement, at ¶ 3. In fact, the Commission's records reflect that in the vast majority of markets, all ITFS stations are licensed to operate from the same site utilizing the same polarization. Thus, it would not be difficult to cross-polarize response stations relative to the downstream ITFS stations in a market.

[124/] Because of the adverse marketplace consequences should service have to be discontinued after it commences, wireless cable operators can be certain to apply these mitigation techniques in advance of the activation of any transceiver that could cause BDC overload. As is discussed in more detail below, many of the mitigation techniques can be employed unilaterally by the operator, while others will require the cooperation of the ITFS licensee that is being protected. Needless to say, no ITFS receive site should be permitted to seek the cessation of operations unless the ITFS licensee has fully cooperated in the use of mitigation techniques.

The CTN Request presented the Commission with a specific scenario for purposes of illustrating the potential for BDC overload. For purposes of demonstrating the efficacy of the available mitigation techniques, the Petitioners have examined not only the potential for interference when the bore-sighted antennas are separated by 50 feet as assumed by CTN, but also when those antennas are separated by 300 feet. As the Commission implicitly recognized when it considered the possibility that WCS would cause interference to MDS/ITFS due to downconverter overload, it is more realistic to assume that the antennas will be separated by 300 feet.[125/] Of course, although it cannot be said that the interfering transceiver will never be as close as 50 feet to an ITFS reception antenna, most ITFS receive sites are located at schools or other buildings that tend to be somewhat isolated from other structures.[126/] Thus, to present the Commission with a more realistic approximation of the potential for interference, the Petitioners have examined both separations.

In addition, the Petitioners have examined the potential for interference from transceivers operating not only at 48 dBm, but also at 63 dBm. As discussed above, the Petitioners believe that the Commission should permit the licensing of response stations operating with an EIRP of 33 dBW (or 63 dBm) under the policies proposed in the Petition for use in those isolated instances where higher power is necessary. The Commission should recognize, however, that most response stations will be operating with far lower power levels. Because received signal levels need to be equalized at the response station hub, the EIRP of a given transceiver will vary in relation to its distance from

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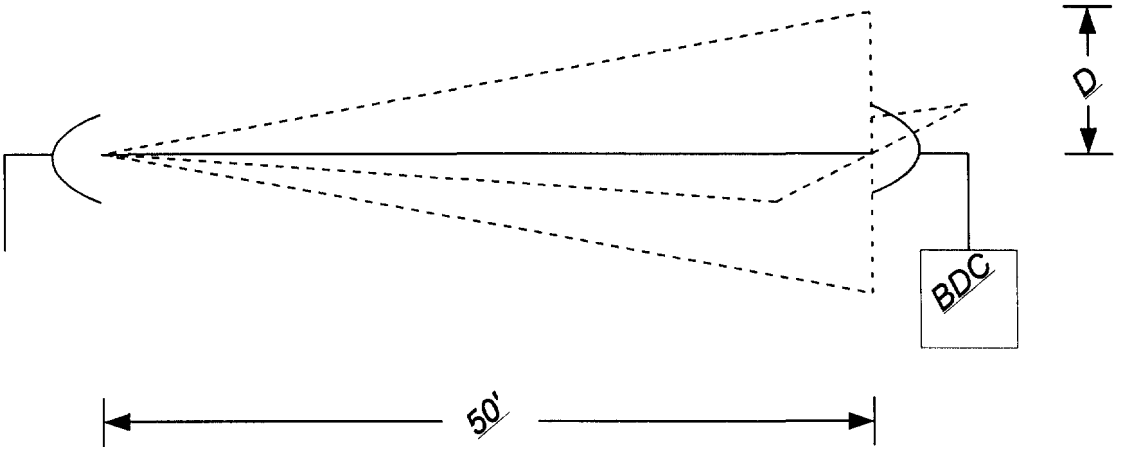
[125/] *See WCS Report and Order*, 12 FCC Rcd at 10863-64; *WCS Reconsideration Order*, 12 FCC Rcd at 3981-86.

[126/] Most schools, for example, are surrounded by fields, playgrounds and/or parking lots.

the hub. Only those farthest away from the hub will operate at higher power levels. Nonetheless, while those few transceivers operating at an EIRP of 33 dBW will present a somewhat greater risk of downconverter overload, the Petitioners have determined that any risk can be managed through application of one or more of the interference elimination techniques discussed below.

Technique 1 -- Cross Polarization: CTN's scenario, and all of the analyses performed by the technical consultants to the Petitioners, have assumed that the signal of the ITFS transmission and the signal from the transceiver would be co-polarized. Although cross-polarization may not be possible in all cases due to other interference-avoidance considerations, it will often be the case that the return path operations can be cross-polarized to the downstream facilities in the market, affording an additional 20 dB in attenuation. Although the following discussions will also assume for purposes of presenting a worst case scenario that the desired and undesired signals are co-polarized, the Commission should recognize that an additional 20 dB of attenuation above and beyond that provided by the other mitigation techniques is likely to be available due to cross-polarization.

Technique 2 -- Antenna Offset: A simple technique that can be employed to address downconverter overload interference is to physically offset the two antennas from each other until the sidelobe attenuation of the antennas provides sufficient protection to the BDC. As noted above, the minuscule potential for downconverter overload approaches zero as the antennas are moved away from a bore-sighted condition. Because the installer of the transceiver will know the location of ITFS receive sites within close proximity, the installer can unilaterally employ this technique at the location of the transceiver, or it can be employed with the cooperation of the ITFS licensee by also adjusting the mounting of the ITFS reception antenna at the receive site.



In the illustration above, D represents the distance the two antennas would have to be offset in order to provide sufficient attenuation for BDC protection. The distance D can occur in the horizontal or vertical plane or in a combination of the two. The amount of attenuation will be a function of the antenna pattern chosen for the transmit and receive antennas. Examining the scenario where the undesired transmitter is operating with an EIRP of +48 dBm at a location 50 feet from the receive antenna, the two antennas would have to be offset by 13.4 feet or greater in order to obtain the required 32 dB of total attenuation, assuming use of the FCC reference antenna specified in Section 21.902(f)(3) of the Commission's Rules. This could be obtained by offsetting the antennas 13.4 feet or greater horizontally or vertically or by offsetting both horizontally and vertically by 9.1 feet or greater. Upgrading the antennas to typical 24 dBi patterns, the required offset drops to 7 feet or more horizontally or vertically or 4.9 feet or more if both directions are used. Increasing the separation of the antennas to 300 feet would require an offset of 58 feet or more in one direction to achieve the necessary attenuation using the FCC antenna. Increasing the size of the antennas to 24 dBi, the offset requirement with 300 feet of separation is 31.5 feet or more.

Technique 3 — Improved Antenna Performance: As noted above, improving the performance of the transmit or receive antenna in combination with offset will reduce the potential area of interference. Narrowing the beamwidth and reducing the magnitude of the sidelobes of the upstream transmit, downstream receive or both antennas (and thus increasing the antenna discrimination between the sites) will reduce the potential for overload. In cases where antennas are not bore-sighted, increasing the antenna size of one or both antennas can eliminate any interference. Below is a table showing some typical antennas and the required offset for each in order to obtain the -28 dBm level at the input to the BDC. This chart assumes both the transmit and receive antennas are the same model. Note that in many cases, ITFS receive sites already employ antennas with performance characteristics superior to the FCC reference area, so that the discussion above of identifying small areas where mitigation techniques may be required is conservative, as the

mitigation area shrinks where the sidelobe discrimination of the ITFS receive antenna is superior to that of the FCC reference antenna.

	50' Antenna Separation				300' Antenna Separation			
	+48 dBm		Max EIRP		+48 dBm		Max EIRP	
Antenna	H or V	Diagonal	H or V	Diagonal	H or V	Diagonal	H or V	Diagonal
FCC	13'	9'	34'	24'	58'	41'	64'	45'
21 dBi	15'	11'	18'	13'	80'	57'	86'	61'
24 dBi	7'	5'	9'	6'	32'	22'	42'	30'
4' Grid P26A48KG	14'	10'	60'	42'	64'	45'	75'	54'
6' Grid P26A72KG	8'	6'	29'	21'	26'	19'	48'	34'
4' Solid P2548SR	11'	8'	23'	16'	32'	23'	61'	43'

Technique 4 -- Attenuation: Another simple solution to eliminating the interference from downconverter overload predicted under the CTN assumption of a 50 feet separation between bore-sighted antennas and a +48 dBm undesired signal level is to attenuate the input to the BDC. Under CTN's scenario, there would be ample C/N available to allow insertion of a microwave attenuator at the front end of the downconverter. At a separation of 50 feet, the undesired signal would have to be attenuated an additional 32 dB to meet the -28 dBm BDC overload point. Although the C/N of the desired would drop to 45 dB, this C/N level will result in excellent picture quality for an analog picture and no measurable degradation in bit error rate ("BER") for a digital signal.[127] Note

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[127] Although the scenario presented by CTN can be addressed through attenuation alone without material degradation in the quality of the signal received at the ITFS receive site, it raises the question of how to address situations where the desired signal level is sufficiently weak that the receive site cannot tolerate a significant reduction in the signal level through the application of a mitigation technique that somewhat reduces desired signal levels.

Of the specific techniques discussed in this section of Petitioners' Comments, several (such as the use of filters or the use of increased dynamic range downconverters) will result in a reduction of the C/N. Of course, it will usually be possible to adjust for any loss in desired signal level by increasing the gain of the ITFS reception system through the use of antennas with increased gain and/or adding a low noise preamplifier with a bandpass filter to the output of the antenna.

In most cases, however, it will be possible to decrease the received signal level without any material adverse impact on the ITFS service and the resulting need to compensate. For example, if the downstream receive site is receiving a strong signal from the transmit site and has a C/N of >65 dB, degrading the C/N by 5 dB would still leave the receive site with a C/N of 60 dB, which is excellent by all analog and digital standards. Therefore, the Commission should promote the use

that if the separation between the antennas is increased to a more realistic 300 feet, the attenuation required to avoid downconverter overload is reduced to 16 dB, and the C/N of the desired signal would be 61 dB, well above the 45 dB benchmark. If the undesired signal level were increased to +63 dBm, the required attenuation at 300 feet of separation would be 31 dB and the resulting C/N would remain above the permissible level. The only scenario under which attenuation alone will not eliminate any potential for BDC overload involves an undesired transmitter operating at +63 dBm bore-sighted on an ITFS reception antenna 50 feet away. Under that scenario, additional attenuation of 47 dB is required to avoid downconverter overload. While, inserting 47 dB of attenuation would

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of mitigation techniques that take into account the signal margin which actually exists at that site. A receive site which receives a strong signal and can tolerate the installation of a filter system with additional losses should be allowed a higher degree of degradation than a receive site with a weak desired signal that cannot reasonably tolerate less an increase in noise level.

Under the Commission's existing MDS and ITFS rules, a licensee is always vulnerable to suffering a reduction in C/N to 45 dB as a result of cochannel interference from a neighboring market. Although a licensee may currently enjoy performance greater than 45 dB, the rules permit a co-channel license to establish facilities that will result in a 45 dB C/N. Since facilities must be designed to accommodate such a potential, it would seem reasonable generally to use 45 dB C/N as the benchmark in the deciding whether the mitigation techniques have resulted in an acceptable level of degradation to a received signal level. Moreover, a signal with a 45 dB C/N will be an excellent signal, whether it is an analog or a video signal.

Specifically, the Petitioners propose that the acceptable level of degradation in C/N at a receive site be determined is as follows:

1. Determine the amount of signal margin available at a downstream receive site by measuring the C/N of the desired signal at the output of the block downconverter with the interfering signal turned off. If the C/N is >45 dB, insert attenuation at the input to the block downconverter until the C/N drops to 45 dB. The amount of attenuation added to drop the received signal level C/N to 45 dB is the signal margin. If the C/N is ≤ 45dB at the initial measurement, there is no signal margin.

2. Determine the appropriate fade margin to be allocated to a receive site based on the distance the site is from the desired transmit antenna. Again, if the initial C/N is ≤ 45dB, there is no fade margin allocation.

3. Determine the acceptable level of degradation to the noise performance of the site by subtracting the fade margin from the signal margin. If the difference is negative (fade margin > signal margin) the acceptable level of degradation to C/N is 1 dB maximum. If the initial C/N is ≤ 45dB, the allowable degradation to the C/N of the site is 1 dB maximum.

cause the C/N of the desired signal to drop to 30 dB (which would be below the acceptable level for analog video and marginal at best for a digital service), attenuation could be combined with other techniques to mitigate the overload.

Technique 5 -- Improved BDC Dynamic Range: Another possible solution is the use of a BDC with improved overload protection. A major BDC manufacturer, has proposed to the Petitioners that it could manufacture a BDC with 17 dB of improved dynamic range over its existing product. This new BDC would operate at 20 dB of gain and have a noise figure of 5 dB. This downconverter would require the insertion of only a 15 dB pad to attenuate the undesired signal when the antennas are separated by 50 feet. Applied to the CTN scenario, use of this BDC would result in a C/N of 59 dB, which is well above the benchmark. At 300 feet of separation the improved BDC alone eliminates overload from an interfering transceiver operating at +48 dBm EIRP. Increasing the EIRP to +63 dBm will require the improved BDC and a 30 dB attenuator in front of the BDC at 50' of separation. This will result in a C/N of 44 dB or roughly equivalent performance with the existing BDC and a 32 dB pad. The one dB degredation in C/N below 45 dB could be made up by applying some of the other techniques listed in this section. Increasing the separation to 300' would lower the pad requirements to 16 dB and would result in a C/N of 60 dB.

Technique 6 -- Field Tunable Notch Filter: Another major BDC manufacturer has proposed the use of a field tunable notch filter to eliminate the potential for BDC overload. It has identified filters that can attenuate signals in a 6 MHz portion of the 2.5 to 2.7 GHz band by 30 to 40 dB. The insertion loss at frequencies outside of the 6 MHz channel would be approximately 3 dB. These filters could also be connected in series to eliminate more than one interfering signal. Insertion of this filter would immediately correct the 50 foot separation case at +48 dBm EIRP for the undesired. The resulting C/N of 74 dB remains well above the benchmark. The +63 dBm case would require an additional 15 dB of attenuation, yielding a C/N of 59 dB that is also well above the benchmark. At 300 feet of separation, the notch filter corrects all interference problems without application of other techniques.

Technique 7 -- Bandpass Filter: A third major BDC manufacturer, has proposed the use of interdigital bandpass filters around the desired signal to eliminate the problem. Filters are available with approximately 2.5 dB of insertion loss and can vary in passband from 8 channels to 31 channels. For an 8 channel bandpass, the maximum attenuation 6 MHz away from the last channel edge is 27 dB. For example, a bandpass could be created for the A and B group channels and the attenuation would reach 27 dB by channel D1 and 51 dB by channel C2. Therefore, as long as the undesired signal is 6 to 12 MHz away, this approach eliminates all cases of interference. As the bandwidth of the filter grows, the attenuation per MHz begins to decrease. For a 16 channel bandpass, the maximum attenuation 6 MHz away from the last channel edge is 10 dB. For example, a bandpass could be created for the A through D group channels and the attenuation would reach 10 dB by channel F1, 27 dB by channel E2 and 40 dB by channel F2. This filter would require the

undesired signal to be 18 to 24 MHz away to eliminate the potential for overload without being concerned with other techniques.

Technique 8 -- Rotation of Return Path Transmitter to a Different Hub Site: By adding hub sites to a two-way system, an operator can create the opportunity for return path transmitters to "see" more than one hub site. This is illustrated by Exhibit 6, which illustrates how response service areas will overlap in order to provide operators the ability to serve a given subscriber from more than one hub. The ability to transmit to more than one hub site can be used as a tool to prevent brute force overload to the downstream receive sites of another operator. As long as the angle of rotation of the transceiver antenna is sufficient to give the required attenuation to the return path signal, an ITFS receive site can be protected merely by associating the transceiver with a different hub.

Technique 9 -- Insertion of Microwave Absorption Material: All of the analyses presented in these Comments by the Petitioners assume free space conditions. Thus, they are quite conservative because they ignore that there will often be terrain or man-made obstructions between a transceiver and an ITFS receive site that blocks the signal from the transceiver and eliminates any predicted BDC overload. As a technique for mitigating predicted overload conditions, it may be practical in certain situations to create an obstruction between the return path and the downstream antennas. A microwave absorptive material could be used to create a blockage of the upstream transmission. Testing concerning elimination of cochannel interfering signals has shown the ability to achieve as much as 30 dB of attenuation to the desired signals through the application of this technique.

Technique 10 -- Phased Antenna Arrays: It is feasible that a phased array antenna system could be employed at the downstream receive site to attenuate the interfering signal, by using a second receive antenna system to combine an out of phase sample of the interfering signal with the incoming primary signal. This system would be most effective if the dual antenna system were built into a single feed with an external adjustment available for tuning the null created from the sample antenna. In fact, existing planar antenna designs offered today consist of multiple dipole antennas combined in a single package to create the composite antenna pattern. These designs could be used as the starting point to create an array to sample and eliminate a potential interfering signal.

Technique 11 -- Combinations: Obviously, combinations of each of the above solutions can be used to eliminate any instance of downconverter overload. For example, if the undesired signal were operating at +63 dBm and 300' away, using a 24 dBi antenna for the undesired transmit antenna, an offset of 7' feet and a 12 dB pad on the input of the improved dynamic range BDC would eliminate any potential for interference, while still yielding an excellent for the desired of 62 dB.

Technique 12 -- Shut Down the Transceiver: In the highly unlikely event none of the above listed techniques eliminates the interference, the response station(s) causing the interference would have to be shut down.

3. In Light Of The Various Mechanisms For Controlling Downconverter Overload, Adoption Of CTN's Inflexible Approach Would Be Counterproductive.

As noted above, it appears that CTN is proposing a licensing system that would limit commercial response usage to MDS Channels 1 and 2/2A and the G and H Group channels, would limit ITFS response usage to the 125 kHz channels,[150] and require that a 24 MHz guardband exist between any response channel and any channel used for downstream transmissions.[151] Apparently, CTN believes that this 24 MHz guardband will permit ITFS licensees to employ filters, downconverters with greater immunity to overload conditions, or a combination of the two to avoid the potential for interference due to downconverter overload.[152] While, as discussed above, the Petitioners would be the first to concede that filters and downconverters with greater immunity to overload are effective tools in mitigating interference due to downconverter overload, the preceding section establishes beyond peradventure that a variety of other tools can be equally effective in addressing any problem that does arise. Thus, the Petitioners would urge the Commission to reject CTN's proposal as inflexible, regulatory overkill.[153]

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[150] However, as noted *infra* at note 153, it is unclear whether CTN is proposing to permit upstream use of the 125 kHz channels if the G and H Group channel licensees within 24 MHz of the 2686-2690 MHz band employ their spectrum for downstream transmissions.

[151] *See* CTN Request, Engineering Statement, at ¶¶ 7-8b.

[152] *See id.* at ¶ 5.

[153] In addition to the concerns expressed elsewhere in this filing, it is unsettling that CTN insists that ITFS licensees have the benefit of a guardband from MDS return paths, while apparently advocating that ITFS licensees be allowed to utilize the existing 125 kHz channels immediately adjacent to channel G4 without regard for potential interference to G4 or any other channel that would suffer downconverter overload as a result. *See CTN Request,* at 4.

At the outset, mandatory guardbands of the type advocated by CTN are generally look upon with disfavor.[154/] As the Commission has recognized:

> [g]uard bands are spectrally inefficient and, as a rule, are used only when coordination is impractical. A more efficient and far more common approach to prevent mutual interference is to isolate users by a combination of factors including frequency, distance, power and antenna height. In any particular case there are usually several choice, limited, of course, by cost, equipment characteristics, and the nature of the service. This approach has been used for years in all of the radio services regulated by the Commission . . ..[155/]

That is especially true here, where the proposed guardband is both unnecessary and would deny ITFS and MDS licensees, wireless cable operators and the public many of the benefits that can be realized from flexible use of the 2.1 and 2.5 GHz bands.

Restricting upstream transmissions as proposed by CTN would also undercut the flexibility MDS and ITFS licensees would have under the Petitioners' proposal to meet whatever demand for educational and commercial two-way services emerges in the future. Because adoption of CTN's guardband proposal would arbitrarily limit the amount of spectrum available for commercial and ITFS response channels, it may artificially prevent satisfaction of the growing demand for educational and commercial two-way communications. Yet, there is no reason apparent from the CTN Request, and none known to the Petitioners, why 6 MHz channels within the 2.5 GHz band other than the G and H Group channels could not also be used for response channels. Indeed, the

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[154/] The CTN Request is not only silent as to why a guardband of 24 MHz is appropriate, but also fails to explain why in an *ex parte* presentation to the Commission just days before filing the CTN Request, CTN urged the Commission to "[r]equire 6 MHz guard bands for all upstream transmissions." Wallace Letter, at Attachment IV.D.2.

[155/] *Broadcast Corporation of Georgia (WVEU-TV)*, 96 F.C.C.2d 901, 908 (1984)

CTN Request is difficult to square with CTN's own prior pronouncement that "[t]he configuration of two-way transmission systems will vary market by market; therefore, the rules adopted in this proceeding should provide sufficient flexibility for licensees within each market to develop two-way services which meet their needs."[156/]

As the Petition and the comments submitted by ITFS licensees in response to the *Public Notice* demonstrate, there is a substantial demand within the educational community for ITFS wireless return path capabilities. One of the fundamental objectives of the drafters of the Petition was to assure that all ITFS licensees, regardless of whether they have chosen to affiliate with a wireless cable operator, should have enhanced flexibility in their use of the spectrum.[157/] As comments such as those filed by PACE Telecommunications Consortium in response to the *Public Notice* demonstrate, a demand for two-way capabilities on ITFS channels exists even among ITFS licensees that are not leasing excess capacity.[158/] Not surprisingly, the NIA/WCA Joint Proposal specifically provides that "ITFS licensees should have opportunities equal to those afforded MDS licensees to implement advanced technologies utilizing their spectrum." Adoption of CTN's proposal, however, would apparently deny all but G Group ITFS licensees the ability to use their own 6 MHz channels for return paths. Instead, CTN would apparently restrict most other ITFS

[156/] Wallace Letter, Attachment at II.B.

[157/] *See* Petition, at 18 ("The proposed rules . . . have been carefully crafted to provide all ITFS licensees — whether or not they lease excess capacity for wireless cable operations — to take advantage of the potential that digital technology offers.").

[158/] *See* Comments of PACE Telecommunications Consortium, File No. RM-9060, at 2 (filed May 14, 1997).

licensees to their 125 kHz channels for upstream channels. And, as noted *supra* at note 153, it appears that in many circumstances ITFS licensees would not even be permitted to use their 125 kHz channels for upstream use. The Commission has already rejected one proposal that would have prevented ITFS licensees from using their own 6 MHz channels for return paths, and should do so again.[159/] Instead, to assure that all ITFS licensees have an opportunity to employ their spectrum more flexibly, the Commission should allow all ITFS channels to be used for return path transmissions where such use can be accomplished in accordance with the Commission's interference protection rules.

Moreover, adoption of CTN's proposal would artificially limit the amount of spectrum that could be employed by a wireless cable operator for the commercial provision of return paths. Although it is too early to determine with any specificity, the Petitioners suspect that systems may require more than MDS Channels 1, 2/2A and the G and H Groups for response paths. This is particularly true in those markets where not all of those particular channels are available for use by the wireless cable operator. Indeed, it would appear that CTN is proposing that unless the G Group licensee voluntarily agrees to cooperate, only MDS Channels 1 and 2/2A would be available for commercial return path use -- a result the Commission has rejected as being unduly restrictive.[160/] While the Petitioners appreciate CTN's effort to minimize the potential for harmful electrical interference from return paths, the interference protection rules proposed in the Petition meet that

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[159/] *See NPRM*, at ¶ 13.

[160/] *See id.*

objective while allowing system operators the scalability they may need to meet increasing demands for return path capacity.

Ultimately, the Commission must ask itself why an educational or commercial system designer should be barred from employing channels other than those proposed by CTN for return path use in those markets where the use of other channels may be the most efficient approach to providing return path capability if the system can provide the requisite levels of interference protection through other tools? Given the almost unlimited number of combinations and permutations of licensing situations in markets across the country, the Petitioners do not believe that any "one size fits all" system design is workable. Certainly, CTN's is not.

4. The Petitioners Would Not Object To A Requirement That Potentially Affected Licensees Be Notified Before The Activation Of A Response Station Hub.

In discussions with representatives of CTN, it is clear that one of CTN's concerns is that its members will find it difficult to determine the source of BDC overload should it occur at a registered ITFS receive site. Of course, under the proposal advanced by the Petitioners, before any response station system can be developed, all cochannel and adjacent channel licensees will be served with copies of the application and the Commission itself will be affording all other potentially affected licensees with public notice of the filing of the application.[161/] Thus, all ITFS licensees will be on notice long before any response station is activated as part of the planned response station service.

[161/] *See* Petition, App. B, at 3, 19, 29, 38-39, 49-50 and 59 (proposed Sections 21.27(d), 21.909(e), 21.913(e), 74.911(e), 74.939(d) and 74.985(d)).

Nonetheless, the Petitioners would not object were the Commission to require that the licensee of a response hub licensed to operate in the 2.5 GHz band notify all MDS and ITFS licensees in the band that could be affected by operation of the response hub at least 30 days prior to commencing operation of the response hub. For purposes of this proposal, the licensees entitled to notice would be any licensee with a PSA overlapping the response service area of the hub in any part and any ITFS licensee serving a ITFS registered receive site within the response service area of the hub. This notice would allow licensees an adequate opportunity to notify their receive sites of the potential for BDC overload and to put into place specific procedures for addressing any interference that is observed.[162/]

E. The FCC Should Coordinate The Retuning Of MDS And ITFS Stations To Other MDS Or ITFS Frequencies In The 2.5 GHz Band When The Commission Determines That Such Change Will Facilitate The Introduction Of Advanced Technology.

As the *NPRM* recognizes, the Petitioners do not believe that any MDS or ITFS licensee should be required to cellularize its system against its wishes.[163/] Nor, for that matter, do the Petitioners believe that any licensee should be required to convert its facilities to return path, superchannel or subchannel use against its wishes. However, the CTN Request raises the spectre that one licensee could unreasonably frustrate the introduction of advanced technologies in a market. Designing and operating two-way systems that will function properly and without interference in

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[162/] The 30-day notice period is identical to the notice that a WCS licensee must give to MDS and ITFS licensees that might suffer BDC overload from the commencement of WCS operations. *See WCS Reconsideration Order*, 12 FCC Rcd at 3985.

[163/] *See NPRM*, at ¶ 81.

markets where *all* licensees are participating will be difficult enough. Unfortunately, despite the requirements of Sections 21.902(b)(2), 21.938(a) and 74.903(c) that licensees make good faith efforts to coordinate frequency usage, too many MDS and ITFS licensees and applicants who are not affiliated with wireless cable operators have abused the Commission's interference protection rules to unreasonably frustrate the development of new or modified facilities by their neighbors. As it considers the CTN Request and other proposals, the Commission must take care to avoid empowering any one licensee in a market with the ability to unreasonably frustrate the introduction of new technologies by its neighbors. While adoption of the rules and policies proposed in the following two sections will not fully eliminate the potential for abuse, it will reduce it.[164/]

While for the reasons noted above the Petitioners disagree with the fundamental premise underlying the CTN Request (*i.e.* that downconverter overload will present a serious problem that can only be solved through refarming and limiting return paths to the G and H Group channels), the Petitioners do agree with CTN that the creation of contiguous channel blocks for return path transmissions through the retuning of MDS and ITFS stations to other frequencies within the MDS/ITFS band presents a very valuable tool (although not the only tool) towards minimizing any interference that will result from return path transmissions.

Obviously, it will be difficult to design systems that assure upstream transmissions will protect adjacent channel downstream transmissions from interference, so the fewer situations where

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[164/] To further deter abuses that delay the processing of applications and unnecessarily burden staff resources the Petitioners reiterate their request that the Commission emphasize its intention to impose appropriate sanctions when frivolous petitions to deny or similar pleadings are filed. *See* Petition, at 36, (*citing* "Commission Takes Tough Measures Against Frivolous Pleadings," *Public Notice,* FCC 96-42 (rel Feb. 9, 1996).

upstream and downstream uses are adjacent to each other, the better. Indeed, the comments submitted in response to the *Public Notice* by Schwartz, Woods & Miller on behalf of numerous ITFS licensees (collectively, the "SW&M ITFS Parties") propose that the Commission permit the trading of frequencies within the ITFS and MDS allocations to reduce the risk of harmful interference from the introduction of advanced technologies.[165/] The rules proposed by the Petition afford ITFS licensees the ability to trade licenses across channel groups in order to promote the use of a contiguous block of adjacent channels for return paths,[166/] and the Petitioners supported the proposal advanced by the SW&M ITFS Parties because it would expand this approach to include the potential for placing ITFS licensees on channels currently available solely for MDS use.[167/] Not surprising, the NIA/WCA Joint Proposal also explicitly endorses the adoption of a rule that would allow an ITFS licensee to swap channels with any other ITFS or MDS licensee in the market, and calls upon the Commission to provide expedited processing of applications proposing such swaps.

However, the Petitioners must disagree with CTN's proposal that "refarming" should only occur where the G Group ITFS licensee voluntarily agrees. As CTN concedes, "a shifting of

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[165/] *See* Comments of Schwartz, Woods & Miller, File No. RM-9060, at 6 (filed May 14, 1997)("In some cases, an exchange of ITFS channels where the "wireless cable" entrepreneur pays the costs of relocation so that traditional operations can be moved to channels with less potential for interference may be more useful than a forced participation in a digital video project.")[hereinafter cited as "*SW&M Comments*"].

[166/] *See Petition*, App. B, at 36 (proposing revisions to § 74.902(d)).

[167/] *See* Petitioners' Reply Comments, at 29. Moreover, as is discussed *infra* at page 153, the trading of channels can also be a valuable tool by which an ITFS licensee can assure its ability to provide interference-free downstream capacity even upon the termination of any excess capacity lease.

frequencies should not represent a hardship" to any licensee.[168/] Given the acknowledged ease of retuning ITFS and MDS transmitters to other frequencies in the 2.5 GHz band, the Petitioners believe that the Commission should coordinate the retuning of any MDS or ITFS licensee to other frequencies in the 2.5 GHz band at the cost of the proponent of such retuning when the Commission finds that doing so promotes the introduction of advanced technologies in a spectrally efficient manner.[169/] Neither the G group licensee, nor any other licensee, should be able to deny wireless cable operators, educators and consumers the benefits of advanced technology by unreasonably refusing to modify their own facilities.

The Commission already requires ITFS licensees to modify their facilities in order to promote the most efficient use of the spectrum under certain circumstances.[170/] For the Commission

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[168/] *Id.*, Joint Engineering Exhibit, at ¶ 6.

[169/] In the case where a licensee retunes, its new channels should be regulated under the same rules as its former channels. For example, if a G-Group ITFS licensee swaps channels with the licensee of MDS channels E1-2 and F1-2, the G-Group should be regulated as MDS channels, while the E1-2/F1-2 license should be an ITFS authorization. In order to avoid any unfairness, an ITFS licensee who retunes to the E or F Group channels should not be subject to the restrictions on grandfathered ITFS licensees imposed on ITFS licensees authorized to operate on the E and F Group channels prior to May 26, 1983. *See Amendment of Parts 2, 21, 74, and 94 of the Commission's Rules and Regulations With Regard to Frequency Allocation to the Instructional Television Fixed Service, the Multipoint Distribution Service, and the Private Operational Fixed Microwave Service; Inquiry into the Development of Regulatory Policy with Regard to Future Service Offerings and Expected Growth in the Multipoint Distribution Service and Private Operational Fixed Microwave Service, and into the Development of Provisions of the Commission's Rules and Regulations With Regard to the compatibility of the Operation of Satellite Services with Other Services Authorized to Operate in the 2500-2690 MHz band; Amendment of Parts 1 and 21 of the Commission's Rules and Regulations With Regard to Using Random Selection Procedures to Select Permittees in the Multipoint Distribution Service*, 98 FCC 2d 129 (1984).

[170/] *See* 47 C.F.R. § 74.986. *See also Gen. Dockets No. 90-54 and 80-113 Second Report and Order*, 6 FCC Rcd at 6796-97 (1991)("Parties are sometimes unable to agree, however, rendering

to coordinate the retuning of MDS and ITFS stations to other frequencies in the 2.5 GHz band in order to promote the most efficient use of spectrum would hardly be unique in the annals of the Commission.[171/] Indeed, for the Commission to mandate that an MDS or ITFS licensee retune to other frequencies in the 2.5 GHz band would represent a minor intrusion compared to the many cases where the Commission has required licensees to make major changes in operating frequencies in order to promote the most efficient usage of the spectrum.[172/] For example, the Commission has

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potentially beneficial modifications impossible.")

[171/] *See, e.g., Broadcast Corporation of Georgia (WVEU-TV)*, 96 F.C.C.2d 901 (1984)(adopting a plan that required mobile radio licensees to change their authorized frequencies at the cost of the licensee of WVEU-TV (Atlanta, GA) when such changes were necessary to allow WVEU-TV to operate at full power without interference to the land mobile licensees); *Amendment of Section 73.202, Table of Assignments, FM Broadcast Stations*, 8 F.C.C.2d 159 (1967)(requiring WNRE (Circleville, OH) to switch from channel 285A to channel 296A in order to accommodate introduction of new station using channel 285A at Columbus, OH).

[172/] *See, e.g. Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*, 7 FCC Rcd 6886 (1992)(adopting rules requiring licensees in the 1850-1990, 2110-2150 and 2160-2200 MHz bands to relocate to higher bands or other media to accommodate emerging technologies); *Amendment to the Commission's Rules Regarding A Plan for Sharing the Costs of Microwave Relocation*, PR Docket No. 93-144, Gen. Docket No. 93-252, PP Docket No. 93-253, FCC 97-223 (rel. July 10, 1997)(revising 1850-1990, 2110-2150 and 2160-2200 MHz relocation rules to accelerate deployment of emerging technologies); *Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum At 2 GHz For Use By the Mobile-Satellite Service*, 12 FCC Rcd 7388 (1997)(addressing relocation of users of 1990-2025 MHz and 2165-2000 MHz band to permit innovative mobile satellite services); *Amendment of the Commission's Rule to Relocate the Digital Electronic Message Service From the 18 GHz Band to the 24 GHz Band and to Allocate The 24 GHz Band For Fixed Service*, 12 FCC Rcd 3471 (1997)(requiring all DEMS licensees to relocate to 24 GHz band to promote efficient use of 18 GHz band). For similar reasons, in those services where frequency coordinators are employed, the Commission has vested those coordinators with the discretion to ignore an applicant's request for specific channels and assign other channels where appropriate to maximize spectral efficiency. *See Frequency Coordination in the Private Land Mobile Radio Services*, 103 F.C.C.2d 1093, 1108-09 (1986).

already adopted rules requiring grandfathered point-to-point ITFS licensees to migrate from the E group and F group channels to entirely different frequency bands under certain circumstances.[173] More recently the Commission re-affirmed its decision to require any incumbent licensee in the 816-821/861-866 MHz Specialized Mobile Radio Service ("SMR") band to retune to other SMR frequencies when it is requested to do so by the Economic Area ("EA") licensee for that band, the EA licensee agrees to pay the reasonable costs associated with the retuning, and comparable facilities are available.[174] The Commission recognized that "while voluntary negotiations are important and to be encouraged, mandatory relocation is necessary to achieve the transition to geographic area licensing and to enhance the flexibility of EA licensees on the upper 200 channels."[175] Along similar lines, Commission recently explained its decision to mandate the retuning of an FM broadcast station as follows:

> The Commission recognizes that a channel shift by an existing licensee can be disruptive to the station's operation. However, we have consistently found that the public interest arising from the initiation of a new service outweighs the disruption to the existing station.[176]

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[173] *See PR Docket 90-54 Report and Order,* 5 FCC Rcd at 6414-15.

[174] *Amendment of Part 90 of the Commission's Rules to Facilitate Future Development of SMR Systems in the 800 MHz Frequency Band,* 12 FCC Rcd 9972, 9984-91 [hereinafter cited as "*800 MHz Reconsideration Order*"] *(affirming Amendment of Part 90 of the Commission's Rules to Facilitate Future Development of SMR Systems in the 800 MHz Frequency Band,* 11 FCC Rcd 1463, 1507-10 (1995)).

[175] *800 MHz Reconsideration Order,* 12 FCC Rcd at 9984.

[176] *Amendment of Section 73.202(b), Table of Allotments, FM Broadcast Stations. (Smith and Reno, Nevada, Susanville and Truckee, California),* 12 FCC Rcd 10218, 10220 (1997), *citing Ava, Branson and Mountain Grove, Missouri,* 10 FCC Rcd 13035 (1995).

If the Commission can routinely order broadcasters to retune, despite the substantial advertising and promotional investment broadcasters make in promoting their frequency to the public, the Commission can certainly order non-broadcast MDS and ITFS licensees to swap frequencies. While voluntary retuning negotiations along the lines advocated by CTN are to be promoted, the Commission should not permit any licensee's unreasonable refusal to retune to deter the introduction of innovative new wireless cable services.

In order to avoid disputes over retuning, the Petitioners believe the Commission should adopt clear and concise procedures to guide the parties during voluntary negotiations and govern the resolution of disputes that cannot be resolved without Commission coordination.

Consistent with the Commission's approach elsewhere, the Petitioners are of the view that retuning should be required only where the requesting party can demonstrate to the Commission the availability of "comparable facilities" in the 2.5 GHz band. Obviously, no licensee should be required to operate from a different channel if it can demonstrate to the Commission that the retuning would have a material adverse impact on its operations. For these purposes, Petitioners propose that "comparable facilities" generally should be deemed available where it is possible for the existing facility to retune to other MDS or ITFS channels in the 2.5 GHz band while still enjoying a 45 dB desired-to-undesired ("D/U") signal ratio from co-channel operations and a 0 dB D/U signal ratio from adjacent channel operations.[177/]

[177/] In demonstrating that the 45 dB/0 dB standard can be achieved, the requesting party should be permitted to propose receive antenna upgrades and the replacement of obsolete pre-May 26, 1983 downconverters, just as any applicant can today pursuant to Section 74.903(a) of the Commission's Rules. Moreover, the Petitioners believe that an exception to the 45 dB/0 dB requirement should exist to address those situations where the licensee being asked to retune has

In order to avoid unnecessary burdens on the Commission's staff, the Petitioners believe retuning proposals should be subject to private negotiations before being brought to the Commission. To accomplish that objective, the Petitioners propose a three-step process for handling retuning proposals – (1) notice; (2) negotiations; and (3) Commission intervention.

> (1) Notice – The requesting party should be required to provide the licensee with written notice requesting that the licensee retune to other channels in the 2.5 GHz band, agreeing to pay all costs associated with such retuning,[178/] and demonstrating that comparable facilities are available.
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> (2) Negotiations – Service of the notice should commence a period during which the parties can negotiate arrangements for retuning. At any time more than thirty (30) days after service of the notice, either party may terminate negotiations. If the negotiations lead to a voluntary agreement, the licensee can then file an application with the Commission proposing to change to other channels, which application will be treated like any other major modification application. If the negotiations are terminated without an agreement being reached, the proponent of the retuning proposal can then refer it to the Commission for resolution by submitting an application in the name of the licensee proposing a change in channels along with

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either explicitly or implicitly accepted a lower D/U ratio. In those cases, comparable facilities should be deemed present where the D/U ratio will not be reduced in any portion of the MDS or ITFS protected service area (if one exists) or, in the case of an ITFS license, at any registered receive site entitled to protection. *See Digital Declaratory Ruling,* 11 FCC Rcd 18853-54; *Gen. Dockets 90-54 and 80-113 Second Order on Reconsideration;* 10 FCC Rcd at 7083-84; *Amendments of Part 21, 43, 74, 78 and 94 of the Commissions Rules Governing Use of the Frequencies in the 2.1 and 2.5 GHz bands*, 6 FCC Rcd 6764, 6798 (1991) [hereinafter cited as "*Gen. Docket No. 90-54 Order on Reconsideration*"] (holding that point-to-point ITFS licensees being migrated from E and F group channels are not entitled to greater signal quality than they had enjoyed prior to migration).

[178/] As CTN acknowledges, the costs associated with retuning are likely to be minimal because most transmitters in use today can be readily retrofitted at reasonable cost to operate on any channel in the 2.5 GHz band. *See* CTN Request, Engineering Statement, at ¶ 6. In addition, in those few cases where licensees do not use broadband downconverters capable of receiving the entire 2.5 GHz band, it may be necessary to replace existing downconverters with downconverters capable of receiving the channels to which the transmitters will be retuned. While the requesting party should be required to ensure a seamless transition to the new channels, the licensee should be required to cooperate in a reasonable manner in connection with the transition.

any other contingent applications necessary to effectuate the returning (such as a proposal by another licensee to retune its channels to make channels available for the proposed mandatory retuning). Although an application by an ITFS licensee to change channels is generally considered to be major change applications that can only be filed during a filing window, if the Commission continues to accept major modification applications only during periodic filing windows, applications filed in connection with a voluntary or Commission-coordinated retuning should be accepted at any time and cut-off from competing applications as of the close of business on the day of filing. However, because the Commission must determine whether comparable facilities are available before a request for a Commission-coordinated retuning can be granted, applications filed by the proponent of retuning without the licensee's consent should not be eligible for an automatic grant.

(3) Commission Intervention – Upon termination of negotiations and referral, the staff of the Video Services Division should expeditiously determine whether the conditions for retuning (availability of comparable facilities and an offer to pay the cost of retuning) have been satisfied and, if so, should order the prompt retuning of the subject station at the cost of the proponent.

In implementing this approach, the Commission needs to carefully coordinate the effective date of its new rules with respect to the proposed initial filing window for advanced technology applications. Specifically, the Commission should make certain that any new retuning rules become effective sufficiently in advance of the initial filing window that there will be an opportunity for the proponent of any Commission-coordinated retuning to provide the requisite notice, conduct the mandatory negotiations and then file any applications during the initial filing window. In addition, the Commission should permit the filing of applications for the implementation of advanced technologies during the initial window or thereafter that are contingent upon the grant of proposals for retuning filed at the same time. Since retuning may prove an essential predicate to the ability of an applicant for an advanced technology facility to comply with the Commission's interference protection requirements, that applicant would be severely disadvantaged if it had to await the grant

of an application for retuning (which telegraphs to the world its intentions regarding advanced technologies) before submitting its proposal to implement the advanced technology.

F. The Commission Should Reject ITF's Proposal To Eliminate Section 74.986 Of The Rules.

Reacting to a filing by Instructional Telecommunications Foundation ("ITF") in response to the *Public Notice*, the Commission has sought comment on "ITF's request that we prevent the filing of involuntary modification applications that jeopardize existing and future instructional service."[179/] While the Petitioners appreciate that an affiliate of ITF has recently been embroiled in a battle over a proposed involuntary modification and may honestly believe the rule was wrongly invoked for its particular case, the involuntary modification rules play a valuable role in assuring that no ITFS licensee can unreasonably prevent neighboring MDS and ITFS stations from deploying an advanced technology. Thus, Petitioners strongly urge the Commission to retain Section 74.986 of the Rules.[180/]

In adopting Section 74.986, the Commission properly recognized that:

> the Commission has encouraged and will continue to encourage parties to enter into voluntary agreements regarding station modifications and we expect that most modification arrangements will be voluntary in light of the obvious advantages of cooperation for all involved. *Parties are sometimes unable to agree, however,*

[179/] *NPRM*, at ¶ 81 n. 55. The Petitioners are surprised and concerned that the *NPRM* appears to find significance in ITF's unsubstantiated allegation that one wireless cable operator has breached its contract with ITF. *See id.* at ¶ 85 n. 60. Suffice it to say that more than one wireless cable operator believes that its ITFS affiliates have breached their contractual agreements, particularly in refusing to consent to routine transactions until paid monies to which they are not contractually entitled. Where such breaches occur, the appropriate remedy is in the courts, not before the Commission.

[180/] The Petitioners appreciate that involuntary modification applications tend to be controversial in nature and therefore suggest that the Commission exclude involuntary major modification applications from those eligible for automatic grant under the Petitioners' proposal.